Calculating Achievement Scores and Graduation Rates for Title I Focus and Priority Schools: Technical Notes

Creation of the Achievement Score and Point-Based Proficiency Rates

Summary

The Achievement score is one of four sub-scales that comprise a school's overall Accountability Index. This score is comprised of both reading and mathematics proficiency rates measured by the Wisconsin Student Assessment System (WSAS), and is used in calculations to identify Title 1 Focus and Priority schools.

During the transition to the new statewide accountability system, DPI has adopted new cut scores for the WKCE in reading and mathematics. The new benchmarks reflect the more rigorous NAEP proficiency scale that is representative of college and career ready expectations. To ensure all students and subgroups are participating in state assessments, accountability determinations are based on all students enrolled in tested grades for a full academic year (FAY). Proficiency Rates will now be defined on a point-based scale. Specifically, DPI will calculate the number of students achieving Basic, Proficient, and Advanced status on the WSAS using the new NAEP proficiency scale. These students will then be awarded points based on their proficiency level:

- Students achieving Basic will receive 0.5 points;
- Students achieving Proficient will receive 1.0 points;
- Students achieving Advanced will receive 1.5 points;

These points will then be summed, and the sum will be divided by the number of FAY students enrolled. This quotient is defined as the school's Proficiency rate.

Proficiency rates will be calculated using a weighted average of the three most recent years of performance data. The weighting system assigns a weight of 1.5 to the current year, 1.25 to the prior year, and a weight of 1.0 to the second prior year. Each year's proficiency rate will also be weighted by the number of FAY students enrolled in the school that year. These steps are taken to give more weight to a school's most recent performance and, to ensure sound statistical principles by weighting based on the number of FAY students enrolled each year.

Calculations are done separately for reading and mathematics. A school's Achievement score is the average of its weighted reading and mathematics proficiency rates. This weighted Achievement score, based on up to three years of test data, is a departure from Wisconsin's previous system of accountability in which only the current year's test scores were used to make accountability decisions. Using three years of data mitigates yearly fluctuation in a school's proficiency rate, particularly due to small populations prevalent in many Wisconsin schools.

Definitions

WSAS: WSAS is the Wisconsin Student Assessment System, and consists of both the Wisconsin Knowledge and Concepts Examination (WKCE) and the Wisconsin Alternate Assessment for

Students with Disabilities (WAA-SwD). The WAA-SwD is administered only to students with significant cognitive disabilities, when the Individualized Education Program (IEP) team determines that the student is unable to participate in the Wisconsin Knowledge and Concepts Examination (WKCE), even with accommodations. At grades 3 through 8 and 10, all students are tested in both reading and mathematics. Additionally, at grades 4, 8, and 10, students are tested in science, social studies, and language arts.

Cell Size: The minimum number of students required to make a statistically reliable calculation to be used for accountability decisions. Wisconsin's new proposed cell size for achievement measures is 20 FAY enrolled students for all subgroups. For graduation measures, the new proposed cell size is 20 students and includes both FAY and non-FAY students. This is a departure from Wisconsin's previous system that applied a cell size of 40 to all student groups.

Calculating the Achievement Score

Methodology

Determining the Point-Based Proficiency Rates

A schools proficiency rate is the sum of the number of points assigned for each FAY enrolled student, based on whether a student achieved Basic, Proficient, or Advanced on the WSAS, divided by the number of FAY students enrolled in tested grades. For each school, the proficiency rate is calculated in the mathematics and reading subject areas on the WSAS in each of the past three years.

Weighting the Proficiency Rate – Population Weights

After the proficiency rates are calculated, each year's proficiency rate is weighted by the number of FAY students enrolled in tested grades for each year. These population weights are derived by summing the number of FAY students enrolled in each school and in each year, and then dividing that sum by the number of years of test data the school had, in order to derive a mean number of FAY students enrolled each year:

$$Mean\ FAY\ Students\ Enrolled\ in\ Tested\ Grades\ =$$

$$\frac{N\ FAY\ Students\ Enrolled_{t-2} + N\ FAY\ Students\ Enrolled_{t-1} + N\ FAY\ Students\ Enrolled_{t}}{3}$$

After the mean number of FAY students enrolled is calculated for each school, the number of FAY students enrolled in each year is divided by the mean FAY students enrolled to derive the **population weight** for each year:

$$Population\ Weight_{t-2} = \frac{N\ FAY\ Students\ Enrolled_{t-2}}{Mean\ FAY\ Enrolled}$$

$$Population\ Weight_{t-1} = \frac{N\ FAY\ Students\ Enrolled_{t-1}}{Mean\ FAY\ Enrolled}$$

$$Population\ Weight_{t} = \frac{N\ FAY\ Students\ Enrolled_{t}}{Mean\ FAY\ Enrolled}$$

After the population weights are calculated, each year's proficiency rate is multiplied by its corresponding population weight.

Weighting the Proficiency Rates – More Weight to Recent Years

After the population weights are applied to the proficiency rates, additional weight is given to the most recent year's data. The current year's weighted proficiency rate is given a weight of 1.5; the prior year's weighted proficiency rate is given a weight of 1.25; and the two years prior's weighted proficiency rate is given a weight of 1.0. These new weighted proficiency rates are then summed, and divided by 3.75 (assuming the school has three years of data.) For a detailed explanation of the weighting process and a worked example, see Appendix 1.

Calculating the Final Achievement Score

After the weighting process has been completed, the weighted mathematics and reading proficiency indexes are averaged and placed on a scale from 0 to 100. For example, if a school's weighted mathematics proficiency is 76.9 and its weighted reading proficiency is 84.1, its total weighted average proficiency is 80.5. The school would thus receive an Achievement score of 80.5.

Table 1: Preliminary Summary Data for the Achievement Score for all schools with tested grades in Wisconsin

Number of Schools with Achievement Index Score:	2,040
Minimum Achievement Index Score:	9.9
Mean Achievement Index Score:	65.9
Maximum Achievement Index Score:	100

Calculating Graduation Rates

Schools with the lowest subgroup graduation rates and schools with the largest gaps between their subgroup graduation rates are identified as Focus schools. Graduation rates are calculated using two separate formulas: the four-year adjusted cohort rate and the six-year* adjusted cohort rate. The four-year adjusted cohort rate is calculated by taking the number of students in the cohort who graduate within four years with a regular high school diploma and dividing by the number of students who form the four-year adjusted cohort for the graduating class. The six-year* adjusted cohort graduation rate is calculated by taking the number of students in the cohort

who graduate within six years with a regular high school diploma and dividing by the number of students who form the six-year adjusted cohort for the graduating class.

* The six-year adjusted graduation rate is not yet implemented, and a five-year adjusted graduation rate will be used in its place.

For each subgroup with at least 20 students, both the four-year and six-year rates are calculated and averaged, to determine a single average rate for each subgroup. To identify schools with the lowest subgroup graduation rates, all subgroup rates are averaged together for each school, and schools are ranked based on their overall subgroup average graduation rate. To identify schools with the largest gaps in graduation rates, gaps are calculated for each subgroup and its comparison group. All subgroup gaps are averaged together, and schools are ranked by this overall average subgroup gap in graduation rates.

Appendix 1 – Explanation of Proficiency Rate Weighting

Consider a hypothetical school with the following information:

	Number FAY Enrolled	Proficiency Rate in Mathematics	Proficiency Rate in Reading
Current Year	75	83%	90%
Prior Year	82	75%	79%
Two Years Prior	90	86%	85%

To calculate the weighted proficiency rate for this school in the current year's accountability calculations, DPI takes the following steps ***for both Mathematics and Reading separately***:

Step 1) Calculate the total number of FAY students enrolled in all 3 years:

Total FAY enrolled = 75 + 82 + 90
Total FAY enrolled = 247

Step 2) Calculate the average FAY enrolled per year:

Average FAY enrolled = Total FAY enrolled / Number of Years
Average FAY enrolled = 247 / 3
Average FAY enrolled = 82.33

Step 3) Derive the weight to be given each year of data based on the number of FAY students enrolled in each year:

Year Weight = Year FAY enrolled / Average FAY enrolled

Current Year Weight = 75 / 82.33 = 0.911
Prior Year Weight = 82 / 82.33 = 0.996
Two Years Prior Weight = 90 / 82.33 = 1.093

Step 4) Apply the weights derived in Step 3 to the Mathematics and Reading proficiency rates by multiplying the percent proficient in each year by the derived weights:

	Number FAY Enrolled	Proficiency Rate in Mathematics	Proficiency Rate in Reading	Weights based on Number FAY Enrolled	Adjusted Proficiency Rate in Mathematics	Adjusted Proficiency Rate in Reading
Current Year	75	0.83	0.90	0.911	0.756	0.820
Prior Year	82	0.75	0.79	0.996	0.747	0.787
Two Years Prior	90	0.86	0.85	1.093	0.940	0.929

Step 5) Multiply the current year adjusted percent proficient in mathematics and reading by 1.5, the prior year by 1.25, and two years prior by 1.0:

	Number FAY Enrolled	Adjusted Proficiency Rate in Mathematics	Adjusted Proficiency Rate in Reading	Weights based on Year	Re-Adjusted Proficiency Rate in Mathematics	Re-Adjusted Proficiency Rate in Reading
Current Year	75	0.756	0.820	1.5	1.134	1.230
Prior Year	82	0.747	0.787	1.25	0.934	0.984
Two Years Prior	90	0.940	0.929	1.0	0.940	0.929

Step 6) Sum the re-adjusted percent proficient in mathematics and reading:

	Number FAY Enrolled	Adjusted Proficiency Rate in Mathematics	Adjusted Proficiency Rate in Reading	Weights based on Year	Re-Adjusted Proficiency Rate in Mathematics	Re-Adjusted Proficiency Rate in Reading
Current Year	75	0.756	0.820	1.5	1.134	1.230
Prior Year	82	0.747	0.787	1.25	0.934	0.984
Two Years Prior	90	0.940	0.929	1.0	0.940	0.929
				Sum:	3.008	3.143

Step 7) Divide the sums by 3.75. The divisor is 3.75 because this school has three years of data (1.5+1.25+1.0 = 3.75).

	Number FAY Enrolled	Adjusted Proficiency Rate in Mathematics	Adjusted Proficiency Rate in Reading	Weights based on Year	Re-Adjusted Proficiency Rate in Mathematics	Re-Adjusted Proficiency Rate in Reading
Current Year	75	0.756	0.820	1.5	1.134	1.230
Prior Year	82	0.747	0.787	1.25	0.934	0.984
Two Years Prior	90	0.940	0.929	1.0	0.940	0.929
				Sum:	3.008	3.143
				Divisor:	3.75	3.75
				Final Weighted Proficiency Rate	**0.802**	**0.838**